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PATENT ABSTRACTS OF JAPAN

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(43)Date of publication of application : 08.06.1988

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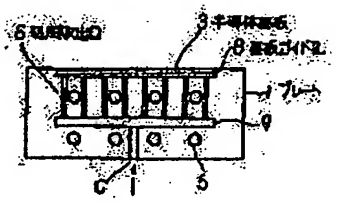
H01L 21/30

(21)Application number : 61-282843
(22)Date of filing : 27.11.1986

(71)Applicant : NEC KYUSHU LTD
(72)Inventor : HAYASHIDA SHUICHI

(54) THERMAL TREATMENT EQUIPMENT FOR SEMICONDUCTOR SUBSTRATE

(57)Abstract:
PURPOSE: To remove the adhesion of dust and a foreign matter onto a semiconductor substrate by forming a supply opening for hot air floating and holding the semiconductor substrate by pneumatic pressure to the bottom of a substrate guide hole.
CONSTITUTION: A plurality of heaters 5 for heating are buried into a plate 1, and a plurality of hot-air supply openings 6 are provided in suspension. A substrate guide hole 8 is shaped to the upper surface of the plate 1, and the hot-air supply openings 6 are bored to the bottom of said guide hole 8. A gas taken in from an introducing port 10 is controlled at a heating temperature by the heaters 5 in a temperature control chamber 9 set up in the plate 1, and the gas is blown off from the hot-air supply openings 6 as hot air. Previously temperature-controlled hot air in required quantity is blown off from the hot-air supply openings 6, and a substrate 3 is floated up.



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[Patent number]
[Date of registration]
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[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

DERWENT-ACC-NO: 1988-200457

DERWENT-WEEK: 198829

TITLE: Wafer treating method for removing dust - blowing heated air from bottom of plate with wafer guiding hole thus floating wafer NoAbstract Dwg 1/3

PATENT-ASSIGNEE: NEC KYUSHU LTD[KYUN]

PRIORITY-DATA: 1986JP-0282843 (November 27, 1986)

PATENT-FAMILY:

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JP 63136532 A	June 8, 1988	N/A	004	N/A

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 63136532A	N/A	1986JP-0282843	November 27, 1986

INT-CL (IPC): H01L021/32

ABSTRACTED-PUB-NO:

EQUIVALENT-ABSTRACTS:

TITLE-TERMS: WAFER TREAT METHOD REMOVE DUST BLOW HEAT AIR BOTTOM PLATE WAFER GUIDE HOLE FLOAT WAFER NOABSTRACT

DERWENT-CLASS: U11

EPI-CODES: U11-C04A1; U11-F02A2;

⑲日本国特許庁(JP)　⑪特許出願公開

⑫公開特許公報(A)　昭63－136532

⑤Int.Cl.⁴	識別記号	庁内整理番号	⑬公開　昭和63年(1988)6月8日
H 01 L 21/324		D－7738－5F	
21/30	361	H－7376－5F	

審査請求　未請求　発明の数 1　(全3頁)

⑭発明の名称　半導体基板熱処理装置

⑳特　願　昭61－282843

㉒出　願　昭61(1986)11月27日

㉗発明者　林田　秀一　熊本県熊本市八幡町100番地　九州日本電気株式会社内

㉑出願人　九州日本電気株式会社　熊本県熊本市八幡町100番地

㉔代理人　弁理士　菅野　中

明　細　書

1．発明の名称

半導体基板熱処理装置

2．特許請求の範囲

(1) 温度コントロールされたプレート上に半導体基板を搭載して該基板の熱処理を行なう半導体基板熱処理装置において、前記プレートの上面に半導体基板を収容する基板ガイド孔を設け、該基板ガイド孔の底部に、半導体基板を空気圧により浮遊保持する熱風の吹出口を設けたことを特徴とする半導体基板熱処理装置。

3．発明の詳細な説明

［産業上の利用分野］

本発明は半導体製造工程において、半導体基板の熱処理を行う半導体基板熱処理装置に関するものである。

［従来の技術］

従来、このような装置は第3図に示すように、水平に敷設され温度コントロールされたプレート1にレール2により搬入された半導体基板3を該プレート1上に真空口2から真空引きして真空吸着させ熱処理を行う構造のものである。

［発明が解決しようとする問題点］

上述した従来の半導体基板熱処理装置は、プレート1と半導体基板3が吸着状態で処理されるため、プレート1上にゴミ，異物が付着していると、半導体基板3の吸着面に付着し次工程での処理に悪影響を与え、さらにプレート1と基板3の接触によりゴミが発生するという欠点がある。

本発明の目的は前記問題点を解消し、半導体基板をプレートと非接触で熱処理する半導体基板熱処理装置を提供することにある。

［問題点を解決するための手段］

本発明は温度コントロールされたプレート上に半導体基板を搭載して該基板の熱処理を行なう半導体基板熱処理装置において、前記プレートの上面に半導体基板を収容する基板ガイド孔を設け、該基板ガイド孔の底部に、半導体基板を空気圧により浮遊保持する熱風の吹出口を設けたことを特徴とする半導体基板熱処理装置である。

［実施例］

次に本発明の一実施例について図面を参照して説明する。

第１図，第２図において、平行に敷設された搬送レール２に半導体基板３を支持するクランプ４を設け、レール２，２の間にプレート１を設け、プレート１上にクランプ４を受け入れる凹部1aを設ける。プレート１には内部に複数個の加熱用ヒーター５を埋設し、かつ複数個の熱風吹出口６を垂設する。さらにプレート１上面に基板ガイド孔８を設け、該ガイド孔８の底部に前記熱風吹出口６を開口する。尚、導入口10から取入れた気体をプレート１内に設けられた温度制御室９でヒーター５により加熱温度コントロールし、これを熱風として熱風吹出口６から吹き出す。

実施例において、基板３が搬送レール２にてａ，ｂ方向に移送され基板ガイド孔８にセットされる。第２図に示すように熱風吹出口６からはあらかじめ温度制御された必要量の熱風を吹出して基板３を浮遊させる。

以上の説明から明らかなように基板３はプレート１と非接触の状態で熱処理されるために基板裏面へのゴミ付着がなく、接触によるゴミの発生もなくなる。

［発明の効果］

以上説明したように本発明は半導体基板をプレートより浮遊させて熱処理する構造としたため、半導体基板へのゴミ，異物の付着をなくし、さらに接触によるゴミの発生もなくすことができる効果を有するものである。

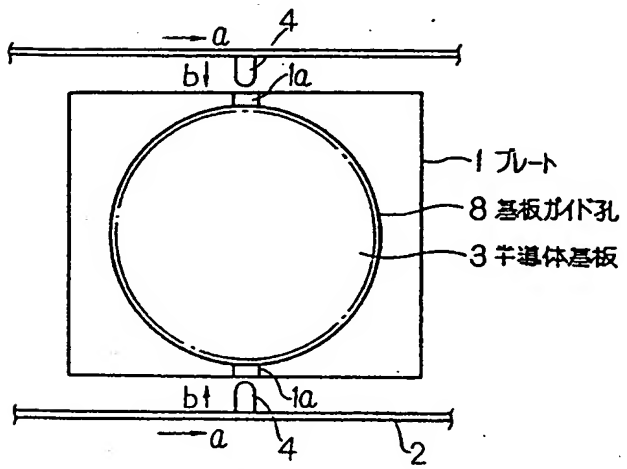
４．図面の簡単な説明

第１図(a) は本発明の一実施例を示す平面図、(b) は同断面図、第２図は第１図の拡大断面図、第３図(a) は従来装置の平面図、(b) は同断面図である。

１…プレート、２…レール、３…半導体基板、４…クランプ、５…ヒーター、６…熱風吹出口、８…基板ガイド孔

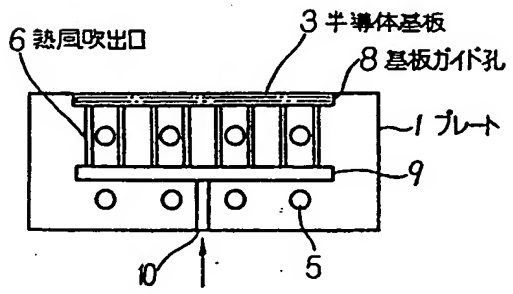
特許出願人　九州日本電気株式会社

代　理　人　弁理士　菅　野　中



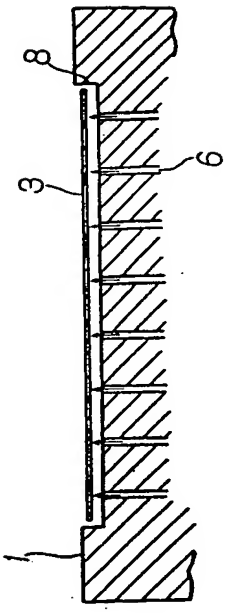
(a)

第１図

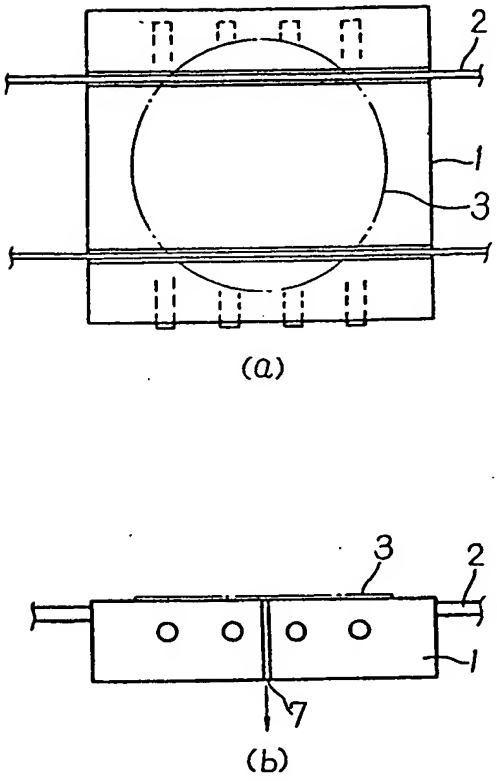


(b)

第１図



第2図



第3図

PTO: 2004-1402

Japanese Published Unexamined (Kokai) Patent Publication No. S63-136532; Publication Date: June 8, 1988; Application No. S61-282843; Application Date: November 27, 1986; Int. Cl.[4]: H01L 21/324 21/30; Inventor: Shuichi Hayashida; Applicant: Kyushu NEC Corporation; Japanese Title: Handoutai Kiban Netsushori Souchi (Semiconductor Substrate Heat Treatment Equipment)

Specification

1. Title of Invention

Semiconductor Substrate Heat Treatment Equipment

2. Claim

Semiconductor substrate heat treatment equipment that performs the heat treatment on the semiconductor substrate while the substrate is mounted on a temperature controlled plate, characterized in that a substrate guide hole is provided on the upper surface of the plate, which accommodates the semiconductor substrate; a hot air blow outlet is provided on the bottom of the substrate guide hole, which floats and holds the semiconductor substrate with air pressure.

3. Detailed Description of the Invention

[Field of Industrial Application]

This invention pertains to semiconductor substrate heat treatment that performs a heat treatment on a semiconductor substrate at a semiconductor production process.

[Prior Art]

This equipment performs the heat treatment as follow. As shown in Fig.3, a semiconductor substrate 3 engaged with a horizontally provided temperature controlled plate 1 using a rail 2 is vacuum-suctioned from a vacuum inlet so as to be attached onto plate 1.

[Problem of Prior Art to Be Addressed]

Prior art semiconductor substrate heat treatment equipment as described above has the following disadvantage because plate 1 and semiconductor substrate 3 are treated at a suctioned state. If dirt or foreign objects are adhered on plate 1, they are also adhered on the suctioning surface of semiconductor substrate 3. It gives a negative effect on the next process. Dirt is further generated by a contact between plate 1 and substrate 3.

The purpose of the invention is to eliminate the aforementioned disadvantages and to offer semiconductor substrate heat treatment equipment that applies the heat treatment without bringing the semiconductor substrate into contact with the plate.

[Measures to Solve the Problem]

The invention is a semiconductor substrate heat treatment equipment that performs the heat treatment on the semiconductor substrate while the substrate is mounted on a temperature controlled plate, characterized in that a substrate guide hole is provided on the upper surface of the plate, which accommodates the semiconductor substrate; a hot air blow outlet is provided on the bottom of the substrate guide hole, which floats and holds the semiconductor substrate with air pressure.

[Embodiment]

An embodiment of the invention is described next with reference to the drawings.

In Fig.1 and Fig.2, a clamp 4 that supports semiconductor substrate 3 is provided on a transfer rail 2 provided in parallel. A recess 1a that receives clamp 4 is provided on plate 1. Multiple heaters 5 are internally embedded in plate 1. Multiple hot air blow outlets 6 are further provided. A substrate guide hole 8 is provided on the upper surface of plate 1. Hot air blow outlets 6 are opened on the bottom of guide holes 8. The temperature of a gas taken from an inlet 10 is heated and controlled at a temperature control chamber 9 using heaters 5. The temperature controlled gas is blown from hot air blow outlets 6 as hot air.

As in the embodiment, substrate 3 and transferred in directions a and b with transfer rail 2 and then set onto substrate guide hole 8. As shown in Fig.2, hot air whose temperature is controlled in advance at a necessary amount is blown from hot air blow outlets 6 so as to float substrate 3.

As is clear as described above, as substrate 3 is heat-treated while it is not in contact with plate 1, no dirt is adhered onto the back surface of the substrate. Dirt is not generated during a contact as well.

[Advantageous Result of the Invention]

As disclosed above, according to the invention, the heat treatment is applied while the semiconductor substrate is floated, dirt and foreign materials will not be adhered onto the substrate. The generation of dirt due to a contact is also eliminated.

4. Brief Description of the Invention

Fig.1 (a) is a top view illustrating an embodiment of the invention. Fig.1 (b) is a cross-sectional view illustrating the embodiment. Fig.2 is an enlarged cross-sectional view illustrating Fig.2. Fig.3 (a) is a top view illustrating prior art equipment. Fig.3 (b) is a cross-sectional view illustrating prior art equipment.

1...Plate

2...Rail

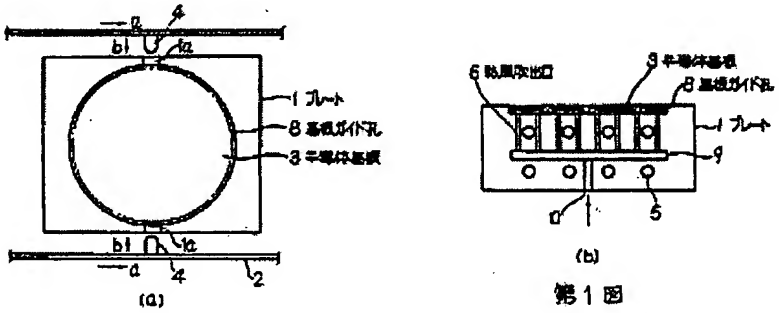
3...Semiconductor substrate

4...Clamp

5...Heaters

6...Hot air blow outlets

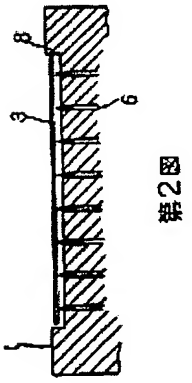
8...Substrate guide hole



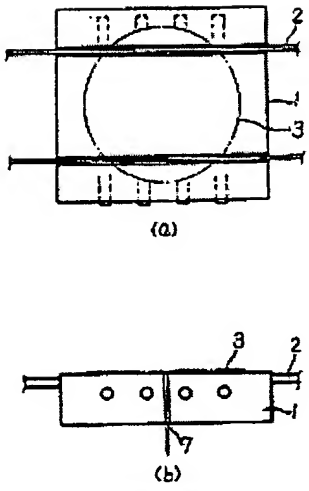
第1図

Fig.1 (a):
1: Plate
3: Semiconductor substrate
8: Substrate guide hole

Fig.1 (b):
1: Plate
3: Semiconductor substrate
6: Hot air blow outlet
8: Substrate guide hole



第2図



第3図

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